

IN THE CLAIMS

Please cancel claim 1 and amend claims 4, 6, 7, 9, and 16 as shown below in the complete listing of claims.

1-3. (Canceled)

4. (Currently Amended) The A low pressure processing system comprising a reaction vessel, an exhaust passage connected to the reaction vessel, and a gate valve provided in the exhaust passage, said system being configured to process a substrate contained in the reaction vessel by a predetermined treatment by supplying a process gas into an interior of the reaction vessel while maintaining an atmosphere of a reduced pressure in the interior of the reaction vessel by evacuating the same through the exhaust passage, wherein:

the gate valve has a valving element and a valve seat;

the valve seat has a first annular surface and the valving element has a second annular surface opposing the first annular surface, the first or second annular surface being provided thereon with a sealing member;

the gate valve hermetically closes the exhaust passage by pressing the second annular surface of the valving element against the first annular surface of the valve seat with the sealing member being interposed between the first and second annular surfaces;

the gate valve also regulates pressure in the reaction vessel by adjusting a gap between the valving element and the valve seat;

the gate valve is provided therein with a plurality of first purge gas supply ports circumferentially arrayed beside the first annular surface of the valve seat to jet a purge gas along the first annular surface of the valve seat; and

the valving element is provided therein with a plurality of second purge gas supply ports circumferentially arrayed beside the second annular surface of the valving element to jet a purge

gas along the second annular surface of the valving element, the low pressure processing system according to claim 1, further comprising:

at least one purge gas valve provided to supply and stop supplying the purge gas from the first and second purge gas supply ports; and

a controller configured to control the purge gas valve so that the purge gas valve is opened to supply the purge gas when the interior of the reaction vessel is supplied with the process gas.

5. (Canceled)

6. (Currently Amended) The low pressure processing system according to claim 4, further comprising a process gas supply system configured to supply the process gas into the reaction vessel to perform the predetermined treatment, wherein the process gas is such that a reaction product of the process gas is unavoidably deposited on an inner surface of the exhaust passage even if the exhaust passage is heated.

7. (Currently Amended) A low pressure processing method comprising:

providing a low pressure processing system, the system including a reaction vessel, an exhaust passage connected to the reaction vessel, and a gate valve, a purge gas valve, and a controller, wherein:

the gate valve has a valving element and a valve seat;

the valve seat has a first annular surface and the valving element has a second annular surface opposing the first annular surface, the first or second annular surface being provided thereon with a sealing member;

the gate valve hermetically closes an exhaust passage by pressing the second annular surface of the valving element against the first annular surface of the valve seat with the sealing member being interposed between the first and second annular surfaces;

the gate valve also regulates pressure in the reaction vessel by adjusting a gap between the valving element and the valve seat;

the gate valve is provided therein with a plurality of first purge gas supply ports circumferentially arrayed beside the first annular surface of the valve seat to jet a purge gas along the first annular surface of the valve seat; and

the valving element is provided therein with a plurality of second purge gas supply ports circumferentially arrayed beside the second annular surface of the valving element to jet a purge gas along the second annular surface of the valving element;

supplying a process gas into an interior of the reaction vessel while maintaining an atmosphere of a reduced pressure in the interior of the reaction vessel by evacuating the same through the exhaust passage, thereby processing a substrate contained in the reaction vessel by a predetermined treatment; and

supplying controlling the purge gas value by the controller to supply the purge gas from the first and the second purge gas ports when the substrate is being processed by the predetermined treatment.

8. (Canceled)

9. (Currently Amended) A pressure control valve system for a low pressure processing system configured to process a substrate contained in the reaction vessel by a predetermined treatment by supplying a process gas into an interior of the reaction vessel while maintaining an atmosphere of a reduced pressure in the interior of the reaction vessel by evacuating the same through the exhaust passage, the control valve system comprising a gate valve having a valving element and a valve seat, a purge gas valve, and a controller wherein:

the valve seat of the gate valve has a first annular surface and the valving element of the gate valve has a second annular surface opposing the first annular surface, the first or second annular surface being provided thereon with a sealing member;

the pressure control gate valve hermetically closes the an exhaust passage of the processing system by pressing the second annular surface of the valving element against the first annular surface of the valve seat with the sealing member being interposed between the first and second annular surfaces;

the pressure control gate valve also regulates pressure in a space connected to the pressure control gate valve by adjusting a gap between the valving element and the valve seat;

the pressure control gate valve is provided therein with a plurality of first purge gas supply ports circumferentially arrayed beside the first annular surface of the valve seat to jet a purge gas along the first annular surface of the valve seat; and the valving element is provided therein and with a plurality of second purge gas supply ports circumferentially arrayed beside the second annular surface of the valving element to jet a purge gas along the second annular surface of the valving element;

a purge gas valve supplies and stops supply of the purge gas from the first and second
purge gas supply ports; and

a controller controls the purge gas valve so that the purge gas valve is opened to supply
the purge gas when the interior of the reaction vessel is supplied with the process gas.

10-11. (Canceled)

12. (Previously Presented) The low pressure processing method according to claim 7, wherein the process gas is such that a reaction product of the process gas is unavoidably deposited on an inner surface of the exhaust passage even if the exhaust passage is heated.

13. (Currently Amended) The low pressure processing system according to claim 4, wherein the gate valve has a main body accommodating the valving element and the valve seat, the main body is provided therein with an annular communication chamber surrounding the valve seat, and the plurality of first purge gas supply ports are in communication with the annular communication chamber.

14. (Previously Presented) The low pressure processing system according to claim 7, wherein the gate valve has a main body accommodating the valving element and the valve seat, the main body is provided therein with an annular communication chamber surrounding the valve seat, and the plurality of first purge gas supply ports are in communication with the annular communication chamber.

15. (Previously Presented) The pressure control valve according to claim 9, further comprising a main body accommodating the valving element and the valve seat, wherein the main body is provided therein with an annular communication chamber surrounding the valve seat, and the plurality of first purge gas supply ports are in communication with the annular communication chamber.

16. (Currently Amended) A low pressure processing system comprising a reaction vessel, an exhaust passage connected to the reaction vessel, and a gate valve provided in the exhaust passage, said system being configured to process a substrate contained in the reaction vessel by a predetermined treatment by supplying a process gas into an interior of the reaction vessel while maintaining an atmosphere of a reduced pressure in the interior of the reaction vessel by evacuating the same through the exhaust passage wherein:

the gate valve has a valving element and a valve seat;

the valve seat has a first annular surface and the valving element has a second annular surface opposing the first annular surface, the first or second annular surface being provided thereon with a sealing member;

the gate valve hermetically closes the exhaust passage by pressing the second annular surface of the valving element against the first annular surface of the valve seat with the sealing member being interposed between the first and second annular surfaces;

the gate valve also regulates pressure in the reaction vessel by adjusting a gap between the valving element and the valve seat;

the gate valve is provided therein with a plurality of first purge gas supply ports circumferentially arrayed beside the first annular surface of the valve seat to jet a purge gas along the first annular surface of the valve seat; and

the valving element is provided therein with a plurality of second purge gas supply ports circumferentially arrayed beside the second annular surface of the valving element to jet a purge gas along the second annular surface of the valving element; and wherein

the low pressure processing system further comprises a purge gas valve provided to supply and stop supplying the purge gas from the first and second purge gas supply ports; and a controller configured to control the purge gas valve so that the purge gas valve is opened to supply the purge gas when the interior of the reaction vessel is supplied with the process gas,

the purge gas valve, the controller, the first purge gas supply port ports and the second purge gas supply ports prevent preventing deposition of reaction-by-products on the gate valve by jetting purge gas on the valve seat and the valving element thereof of the gate valve.